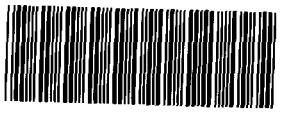
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET SUITE 500
DENVER COLORADO 80202 2466

'93 AUG 1 AM 11 05

OCT 29 1993

Pef 8HWM-FF



Mr Richard Schassburger
Department of Energy
Rocky Flats Office
P O Box 928
Golden, CO 80402-0928

re OU 6 Tech Memo #3

Dear Mr Schassburger

EPA has reviewed your August 4, 1993, Technical Memorandum 3 submittal for OU 6 (Walnut Creek Drainage) Our comments on this submittal are attached As lead regulatory agency for OU 6, EPA will make the approval determination for the subject document EPA comments must be addressed in the final TM 3 submittal Comments submitted under seperate cover by CDH must be addressed to the satisfaction of EPA We will be working with your staff to resolve any outstanding comments and avoid any additional submittals prior to the final

We apologize for the delay in review of this document We will cooperate in expediting finalization of TM 3 and in other steps necessary to recover lost time and avoid possible problems with delivery of the Remedial Investigation Report as scheduled

If you have questions or would like to discuss the progress of this effort, please contact Bill Fraser (EPA) at 294-1081

Sincerely,

Martin Hestmark

Martin Hestmark, EPA
Manager
Rocky Flats Project

cc Joe Schieffelin, CDH
Harlen Ainscouth, CDH
Norma Castaneda, DOE

DOCUMENT CLASSIFICATION
REVIEW WAIVER PER
CLASSIFICATION OFFICE

17982

MHS
20-6

A-OU06-000376

EPA Comments
OU 6 Technical Memorandum #3 - Modeling
October 29, 1993

Generally speaking, the OU 6 model description falls short of the Interagency Agreement (IAG) requirements for model description This tech memo needs to show that the model chosen is appropriate for use in estimating exposure concentrations for risk assessment As such, it must include a summary of sources and types of data that will be used with the models, and the limitations, assumptions, and uncertainties of the proposed model insofar as they may affect the useability of results in risk assessment The OU6 model description should indicate (through the data summary) how model inputs representative of site conditions will be obtained Specific instances where the OU6 model description fails to provide this information for groundwater, surface water, and air models are addressed in the following general and specific comments

1 0 CONCEPTUAL MODEL

General Comments

1 The conceptual model should include at least a brief characterization of the contaminant sources present at OU6 For instance, this section lacks a discussion of whether any contaminants are likely to be present as immiscible phases in the subsurface, or what evidence is available to discount this possibility If contaminants are likely to be present as dense nonaqueous phase liquids, the scope of the modeling effort will have to be expanded to consider multiple pathways at each subsite, particularly some that involve subcropping sandstones

2 The intent of Section 2 0, General Conceptual Model of Operable Unit 6, is to identify and describe potential exposure scenarios for present and future human receptors in OU6 The exposure pathways should be updated as necessary to be consistent with tech memo 2 for OU6

2.0 GROUNDWATER MODEL

General Comments

1 The limitations, assumptions, and uncertainties associated with the use of the ONED3 groundwater model at OU6 have not been provided, as required by the IAG The OU6 shallow groundwater system is a variably saturated, heterogeneous, anisotropic, unconfined aquifer of limited extent Most of the various contaminant sources at OU6 are unlikely to fully penetrate the aquifer Application of the model ONED3 to the shallow groundwater system at OU6 will violate most of ONED3's underlying

2 ONED3's governing equations and initial and boundary conditions should be presented in this document or specific references provided The governing equations and initial and boundary conditions constitute the mathematical framework of a model and are an integral part of the model description This information is necessary for model evaluation

Specific Comments

4 Section 3 2 1, Page 3-3, Paragraph 1 The text states "available site-specific data and fate and transport parameters, source areas, and hydrogeologic conditions will be integrated using ONED3 to simulate the fate and transport of dissolved-phase contaminants in the saturated zone from source areas through the alluvium and colluvium, to discharge points along Walnut Creek "

This statement appears to discount the possibility that contaminants can move from alluvium and colluvium into subcropping sandstones and then discharge into Walnut Creek This situation exists in nearby portions of OU2 in hydrogeologic settings similar to portions of OU6 This situation must either be accounted for or a justification provided for concluding that the bedrock pathways can be neglected without jeopardizing the utility of the model results In addition, the sources of the site-specific data on fate and transport parameters, source areas, and hydrogeologic conditions should be provided A summary of these data would be useful in this document

5 Section 3.2.1, Page 3-3, Paragraph 2 The text states "contaminant fate and transport will also be evaluated using water balance and chemical mass balance analyses as a check for the reasonableness of the ONED3 results " The sources and validity of data for each component of the water and mass balance should be discussed

3 0 SURFACE WATER MODEL

General Comments

1 The surface water model description lacks a clear definition of the model inputs The text only states "model inputs will be a time series of precipitation and groundwater seep flows/loads" and "the time step is anticipated to be daily, or possibly smaller as appropriate to describe rainfall/runoff and erosional processes " The OU6 model description should indicate how data will be input into the model and include a discussion of the data sources and time step(s) to be used, and the types and recurrence intervals of storm events to be simulated It should also discuss how seepage and base flow will be determined and input

2 The model description must specify what data will be used with the model and the sources from which it will be obtained Table 3-2 appears to list value ranges that can be input to the model for each model parameter but does not indicate values that

assumptions, as listed in the ONED3 model documentation The model assumes

A uniformly porous confined aquifer

A homogenous and isotropic aquifer with respect to its hydraulic and transport characteristics

A semi-infinite aquifer in extent (in the positive x-direction) of constant thickness

- A source fully penetrates the aquifer
- A fully saturated groundwater flow regime

One-dimensional, steady-state, uniform, regional flow away from the source,

- The density and viscosity of the solute in the source and in the aquifer are identical and do not change with time
- No solute advection or dispersion into or out of the confining layers

The OU6 model description must list the model's underlying assumptions, discuss how violating the assumptions will affect the model results, show how uncertainty will be accounted for, and provide a justification for selecting this model for risk assessment purposes despite the disparity between assumed and actual conditions

2 The IAG requires that the model description include a summary of the data to be used with the model. The only information provided is the parameter values and ranges in Table 3-1. This table consists of textbook values. Table 3-1 should be replaced with tables that summarize field-derived or locally representative values of hydraulic conductivity, effective porosity, and bulk density, if they are available. If not, it should be explained where these parameters will be obtained and why they will be adequately representative of site conditions.

The OU6 model description gives no information on how the contaminant source terms will be configured in time and space and how this information will be input into ONED3. This information is critical to the model description and should be briefly explained here

Finally, an adequate description of the model should show locations and distances of groundwater pathlines, discharge points to surface water or human receptors, and the length of time the simulations will be run

reflect actual site conditions at OU6 Table 3-2 should include available field-derived values for the model parameters as well as the contamination input values and other boundary conditions or show where adequately representative values for these parameters will be obtained

3 The major contaminant transport and hydrologic equations used by the model should be presented in this report or specific references provided for where they can be obtained

Specific Comments

4 Section 3 3 1, Page 3-6, Paragraph 3 The flow routing technique used with HSPF9 assumes complete mixing in all surface impoundments However, if larger lakes or reservoirs with seasonal stratification are being simulated with HSPF9, then this model would not accurately handle pollutant fate and transport mecnanisms Therefore, this model should only be used for portions of watersheds that do not contain stratified impoundments

5 Table 3-2 The partitioning coefficient between dissolved and suspended states (KDJ) is listed as having no units If defined like other commonly used partitioning coefficients, this should have actual units Actual units should be listed on this table, or this parameter should be more explicitly defined

6 Table 3-2 The partitioning coefficient (KDJ) has a range of values listed as "0-1" However, many contaminants exhibit ratios between dissolved and suspended states that would be much greater than 1 Either this software is incapable of handling partitioning of many contaminants or this range is incorrectly listed Therefore, either the table listing should be corrected, or the parameter definition should be explicitly stated, or the model has a very limited range of usage that excludes may organic contaminants

4 0 AIR TRANSPORT AND DISPERSION MODELS

Specific Comments

1 Section 3 5 1, Pages 3-13 and 3-14 The Box Model is proposed to calculate contaminant concentrations under the following two scenarios (1) the transport of volatile organic compounds into a building and (2) the transport of particulate matter to on-site receptors

The Box Model may not be the most appropriate choice for either scenario In scenario number 1, the Box Model may not accurately estimate concentrations for an enclosure such as a building Under these conditions, it may be difficult to accurately estimate the mean wind speed, a critical mathematical parameter in the Box Model

In scenario number 2, other models such as the Industrial Source Complex Short Term (ISCST) may yield more accurate estimates than the Box Model. This is especially true if the distance from the emission source (the contaminated soil) and the receptors exceeds 100 meters

2 Section 3.5.1, Pages 3-13 and 3-14. The Fugitive Dust Model (FDM) is proposed to calculate contaminant concentrations of particulate matter to off-site receptors The FDM is a widely used model to derive exposure point concentrations. However, due to the complex algorithms used, the FDM is not as efficient as other models This is particularly true when multiple contaminant sources are involved, which is possible in the present modeling. It can take days to complete one computer run Also, EPA in Region 8 prefers the use of the ISCST model

3 Section 3.5, Pages 3-13 through 3-16. It is unclear if the modeled concentrations are calculated from the cumulative effects of all the defined sources. This document may calculate contaminant concentrations individually from the sources. The contaminant concentrations should be calculated from the aggregate effect of all the defined sources. Also, the OU6 model description did not, but should clearly define all input terms used for the Box and FDM models.

5.0 REFERENCES

Beljin, M S., and van der Heijde, P K.M 1993 SOLUTE - Program Package of Analytical Models for Solute Transport in Groundwater. Hydrolink, Inc , Cincinnati, Ohio June.

Interagency Agreement (IAG). 1991 Rocky Flats Federal Facility Agreement and Consent Order between the State of Colorado, the U.S Environmental Protection Agency, and the U.S. Department of Energy January